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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 065636

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

FINISHER, HAND (toys & games) 9-13.01
GLUER (toys & games) 9-13.01
LABORER (toys & games) 9-13.01
PLASTIC-TOY ASSEMBLER (toys & games) 7-13.012
TOY ASSEMBLER (toys & games) 7-13.012

B-570 S-290

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TM 001 936

U. S. Employment Service
in Cooperation with
California State Employment Service

February 1964

GATB # 2481

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TOY ASSEMBLER (toys & games) 7-13.012

B-570

Summary

The General Aptitude Test Battery, B-1002B, was administered to a final sample of 75 women employed as Toy Assemblers at Mattel Incorporated, Lawndale, California. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data and their combined selective efficiency, Aptitudes Q-Clerical Perception, K-Motor Coordination and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Toy Assembly Occupations 9-13.01 and 7-13.012, B-570

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
Q	CB-1- B	85	Q	Part 1	85
T	CB-1- G CB-1- K	80	K	Part 8	85
M	CB-1- M CB-1- N	90	M	Part 9 Part 10	85

Effectiveness of Norms

The data in Table IV indicate that only 67 percent of the non-test-selected workers used in this study were good workers; if the workers had been test-selected with the above norms 74 percent would have been good workers. 33 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 26 percent would have been poor workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the following toy assembly occupations: Finisher, Hand 9-13.01, Gluer 9-13.01, Laborer 9-13.01, Plastic-Toy Assembler 7-13.012, and Toy Assembler 7-13.012.

II. Sample

The GATB, B-1002B, was administered during April and May 1962 to 321 female local office applicants. Forty of these women were hired for employment in the above toy assembly occupations at Mattel Incorporated, Lawndale, California. Twenty-nine women remained on the job long enough for valid supervisory ratings to be obtained and are therefore included in the final sample.

The GATB, B-1002B, was administered to 49 females employed in the above toy assembly occupations at Mattel Incorporated, Lawndale, California. Three women were eliminated from the final sample because their test scores were considered invalid. One of the 46 female employees included in the final sample had only a third-grade education but had no difficulty in taking the GATB.

The final sample consists of 75 females employed at Mattel Incorporated, Lawndale, California. All of these women performed comparable job duties. The minimum training period for the above toy assembly occupations is 8 weeks. All the women in the final sample are considered experienced workers.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 75	M	σ	Range	r
Age (years)	33.2	11.1	18-61	.109
Education (years)	10.8	1.8	3-16	-.057
Experience (months)	13.0	18.2	2-136	-.112

III. Job Description

Job Title: Finisher, Hand (toys and games) 9-13.01
Gluer (toys and games) 9-13.01
Laborer (toys and games) 9-13.01
Plastic-Toy Assembler (toys and games) 7-13.012
Toy Assembler (toys and games) 7-13.012

Job Summary: Assembles toy dolls, guns, animals and parts of toys by hand and by tending specially designed industrial machines, according to written or oral instructions.

Work Performed: Tends specially designed industrial pressing, grooving and felt applicating machines in subassembly of doll eyes, toy gun, trigger mechanism, and drive assembly of rocking horse: Aligns and positions metal or plastic parts of assembly in fixture of machine, and dips other plastic parts in plastic bonding solution. Depresses foot pedal, pulls handle, or pushes fixture to start machine. When assembly is not automatically ejected by machine, removes from fixture, and places it in box.

Performs any one or combination of the following assembly line operations in assembly of toy voice mechanism, eye balls, doll body, dressing of doll, stuffed animals, toy guns and rocking horse: Twists, snaps, and pushes parts together. Dips parts in glue or plastic bonding solution, and clamps parts together with clamping devices. Ties finger ring to string of voice mechanism, using specially designed tying device. Inserts eyeball into eye socket in doll's head with punching device. Aligns eyeball in eye socket with hand tool. Combs hair of doll with steel bristled brush to prepare hair for grooming. Inserts arms and head into torso of doll. Dresses doll with dress, undergarment, shoes, and socks. Sprays specified areas of rocking horse with paint spray gun. Inserts and aligns metal parts of rocking device to rocking horse with hand tools, and rivets rocking device in place with rivet gun. Operates sewing machine to sew fur pelt on toy animal, and stuffs toy with stuffing machine. Impales stuffed animal on spikes of rack on conveyor belt chain to carry animal through steam cleaning room. Brushes fur pelt with steel bristled brush to soften and smooth out hairs. Rubs soiled spots and dirt from stuffed animal with rag soaked in cleaning solvent. Hand sews any broken seams.

Inspects phonograph record label, eyeball assembly, and stuffed animal: Inspects phonograph records to insure labels are correctly centered. Removes uncentered labels and manually presses new label on record. Visually inspects eyeballs to insure all parts are properly aligned and that spots of paint have been removed from eyelashes and eyelids. Inserts record into voice mechanism of doll, pulls string of voice mechanism, and listens to record to insure mechanism works correctly. Picks up stuffed animals, and feels limbs, body, and head to insure animal has been properly stuffed. Manually relocates stuffing to over or under stuffed areas of animal body.

Manually packs assembled toys incardboard cartons: Folds cardboard carton box. Folds end flaps of box, and pushes tab on flaps into slot to fasten flaps. Folds cardboard packing box, and places cartons in packing box in prescribed manner.

IV. Experimental Battery

All the tests of the GATB, B-1002B, were administered to the sample group.

V. Criterion

The criterion data were collected in October and November 1963 and consisted of two sets of independent ratings made by the first-line supervisor using an adaptation of USES Form SP-21, "Descriptive Rating Scale." A period of at least two weeks elapsed between the first and second ratings. The rating scale consisted of five items covering different aspects of job performance, with five alternatives for each item. Weights of one through five, indicating the degree of job proficiency attained, were assigned to the alternatives. A reliability coefficient of .76 was obtained for the criterion. Therefore, the two sets of ratings were combined, resulting in a distribution of final criterion scores of 21-47, with a mean of 35.9 and a standard deviation of 5.6.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Form Perception (P) - required to visually inspect parts of toys and to discern detail in assembled toy.

Motor Coordination (K) - required to coordinate eyes, hands, and fingers in swift, precise movements, and to use tools and aids deftly and quickly, in order to complete one or a combination of toy assembly tasks according to production pace of assembly line.

Finger Dexterity (F) - required to grasp, insert, position and align small parts accurately and quickly; to pick up small hand tools and work aids; and to tend special machines.

Manual Dexterity (M) - required to move hands easily and skillfully in the assembly of toys; and to pick up and grasp parts, tools, and aids, using placing and turning motions.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 75

Aptitudes	M	σ	r
G-Intelligence	79.8	12.3	.100
V-Verbal Aptitude	86.6	12.0	.125
N-Numerical Aptitude	76.0	15.2	.136
S-Spatial Aptitude	87.9	16.0	-.067
P-Form Perception	92.6	16.1	-.189
Q-Clerical Perception	94.8	13.8	.125
K-Motor Coordination	99.4	15.3	.143
F-Finger Dexterity	91.9	16.8	-.172
M-Manual Dexterity	103.0	19.5	.038

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important					X		X	X	X
Irrelevant									
Relatively High Mean						X	X		X
Relatively Low Sigma	X	X				X			
Significant Correlation with Criterion									
Aptitudes to be Considered for Trial Norms						Q	K		M

Trial norms consisting of various combinations of Aptitudes Q, K and M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of Q-85, K-85 and M-85 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing the Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 33 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes Q, K and M, each with a critical score of 85, and the dichotomized criterion for toy assembly occupations. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Toy Assembly Occupations
9-13.01 and 7-13.012
(Q-85, K-85, M-85)

N = 75	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	16	34	50
Poor Workers	13	12	25
Total	29	46	75

Phi Coefficient = .194
χ^2 = 2.850
P/2 < .05

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes Q, K and M, each with a minimum score of 85, have been established as B-1002 norms for toy assembly occupations. The equivalent B-1001 norms consist of Q-85, T-80 and M-90.

IX. Determination of Occupational Aptitude Pattern

The data for this study did not meet the requirements for incorporating the occupations studied into any of the 35 OAP's included in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.